The opinion in support of the decision being entered today was ***not*** written for publication and is ***not*** binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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U.S PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

*Ex parte* KIRK P. BUMGARNER, KENNETH W. ROBERTS and DAVID A. TUCKER

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Appeal No. 2006-0235
Application 09/733,352

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ON BRIEF

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Before GARRIS, WARREN and FRANKLIN, *Administrative Patent Judges.*

WARREN, *Administrative Patent Judge.*

*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 14, 16 through 30, 33 through 37, 59 and 60.[1]

Claim 1 illustrates appellants' invention of a method of screening an optical fiber during a fiber draw process, and is representative of the claims on appeal:

1. A method of screening an optical fiber during a fiber draw process, comprising pulling a length of optical fiber from an optical fiber perform imparting a tensile stress to said fiber to thereby test the strength of said fiber and subsequent to said imparting a tensile stress, winding said fiber onto a spool, wherein said tensile stress is imparted to said fiber via first and second capstan, fiber tension between said capstans is monitored during the draw via a load cell, and the speed of one of the capstans is adjusted in response to feedback from the load cell about the monitored tension to maintain a desired tensile screening force on said fiber.

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[1] The claims stand of record as of the amendment filed May 18, 2004.

The references relied on by the examiner are:

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| Keck et al. (Keck) | 3,711,262 | Jan. 16, 1973 |
| Knowles et al. (Knowles) | 4,148,218 | Apr. 10, 1979 |
| Bice et al. (Bice) | 5.787,216 | Jul. 28, 1998 |

David Halliday et al. (Halliday), *Fundamentals of Physics*, p. 189 (2nd ed. New York, John Wiley & Sons, Inc. 1981).

The examiner has rejected appealed claims 1 through 3, 11, 13, 14, 16 through 22, 36, 37, 59 and 60 under 35 U.S.C. § 103(a) as being unpatentable over Knowles taken with Keck and Halliday (answer, pages 4-8); and appealed claims 4 through 12, 23 through 30 and 33 through 35 under 35 U.S.C. § 103(a) as being unpatentable over Knowles taken with Keck and Halliday as applied to claims 1 through 3, 11, 18, 19, 21 and 22 above, further in view of Bice (answer, pages 8-9).[2]

Appellants argue independent claims 1 and 20 as a group and certain other claims individually with respect to the first ground of rejection, and claim 4 as well as certain other claims with respect to the second ground of rejection (brief,[3] pages 6-9, see also pages 3-6; reply brief, pages 3-10). Thus, we decide this appeal based on appealed claims 1 and 4 as well as the other claims to the extent argued by appellants as representative of the grounds, the remaining claims thus standing or falling based on their dependency on the argued claims. 37 CFR § 41.37(c)(1)(vii) (September 2004).

We affirm.

We refer to the answer and to the brief and reply brief for a complete exposition of the positions advanced by the examiner and appellants.

*Opinion*

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the examiner that, *prima facie*, the claimed method of screening an optical fiber during a fiber draw process would have been obvious over

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[2] The examiner has withdrawn the ground of rejection of claims 1, 13 through 16, 20, 59 and 60 under 35 U.S.C. § 102(b) as anticipated by Knowles (answer, page 3; *see* final rejection mailed October 27, 2004, pages 2-3).

[3] We consider the brief filed May 23, 2005.

Knowles alone and as combined with Bice,[4] as applied by the examiner, to one of ordinary skill in this art at the time the claimed invention was made. Accordingly, since a *prima facie* case of obviousness has been established by the examiner, we again evaluate all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments in the brief and reply brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

In order to review the examiner's application of prior art to the appealed claims, we first interpret independent claim 1, representative of the claims, by giving the terms thereof the broadest reasonable interpretation in their ordinary usage in context as they would be understood by one of ordinary skill in the art in light of the written description in the specification, including the drawings, unless another meaning is intended by appellants as established in the written description of the specification, and without reading into the claims any limitation or particular embodiment disclosed in the specification. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). As illustrated by specification **Figs. 1** and **2**, the plain language of claim 1 specifies a method of screening an optical fiber during a fiber draw process, comprising at least the steps of pulling any length, however small, of any manner of optical fiber **8** from any manner of source of optical fiber perform, *not illustrated*, imparting any amount of tensile stress to fiber **8** to thereby test the strength thereof, and at any subsequent point in the process of manufacturing fiber **8**, winding the fiber in any manner onto any manner of spool, e.g., **15**. The tensile strength is imparted to optical fiber **8** via any manner of first and second capstans **20,24** and the tensile strength is monitored in any manner involving any manner of load cell, *not illustrated*, with any manner of feedback from the load cell processed in any manner and used to adjust the speed to any extent, however small, of either of the capstans **20,24** to maintain the desired tensile

[4] A discussion of Keck and Halliday is not necessary to our decision with respect to either ground of rejection. *See In re Kronig*, 539 F.2d 1300, 1302-04, 190 USPQ 425, 426-28 (CCPA 1976).

screening force on fiber **8**. The transitional term "comprising" opens claim 1 to include methods that at least have the limitations specified in the claim and *any* additional step(s) and component(s). *See*, e.g., *Vehicular Technologies Corp. v. Titan Wheel Int'l Inc.*, 212 F.3d 1377, 1383, 54 USPQ2d 1841, 1845 (Fed. Cir. 2000); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) ("As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term 'comprises' permits the *inclusion* of other steps, elements, or materials.").

We find that appealed claims 16 and 17 as they stand of record are each dependent on canceled original claim 15[5,6] and thus are indefinite, raising issues under 35 U.S.C. § 112, second paragraph. However, in order to resolve prior art issues in this appeal, thus avoiding piecemeal prosecution, we determine that a reasonable, *conditional* interpretation of the language of each of these claims is that they both are dependent on appealed claim 14 on which original claim 15 was dependent, with appealed claim 1 providing antecedent basis for the load cell. We find that appealed claims 33 through 35 encompass substantially the same apparatus limitations. Accordingly, we consider the application of prior art under § 103(a) to appealed claims 16 and 17 on this basis.[7] *Cf. In re Steele*, 305 F.2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962); *Ex parte Saceman*, 27 USPQ2d 1472, 1474 (Bd. Pat. App. & Int. 1993).

We find that Knowles, the principal reference, would have disclosed to one of ordinary skill in the art a method for pulling and strength testing an optical fiber using an apparatus which applies tensile stress to an optical fiber **18** formed by a fiber draw, that is, pulling fiber **18** from

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[5] *See above* note 1.

[6] Contrary to the examiner's finding (answer, page 3), the copy of the appealed claims in the appendix to the brief contains error as each of claims 16 and 17 as set forth therein reads in pertinent part "method of claim, wherein" (page 12).

[7] Our conditional interpretation does not save the claims from their condition. We decline to exercise our authority under 37 CFR § 41.50(b) (September 2004) and enter on the record a new ground of rejection of the appealed claims 16 and 17 under § 112, second paragraph, with respect to these issues, leaving it to the examiner to address the same upon any further consideration of the appealed claims before the examiner. At the same time, the examiner should consider the following: whether claims 24 and 26, both dependent on claim 20, and claims 27 and 28 constitute substantial duplicates (*see* Manual of Patent Examining Procedure § 706.03(K) Duplicate Claims (8th ed., Rev. 3, August 2005)); and whether claims 5, 7 through 9 and 11 find antecedent basis in the claims on which they are dependent for the phrase "said shipping spool."

an optical fiber perform which can be situated in a furnace **42** (e.g., col. 1, ll. 6-31, cols. 2-3, and col. 3, ll. 49-59; **Figs. 1** and **3**). The examiner finds that col. 3, ll. 59-62, of Knowles evinces that winding a formed optical fiber on a spool was known in the art (answer, pages 4-5). We find that appellants acknowledge that "[f]ber draw manufacturing techniques are known wherein the optical fiber is drawn from an optical fiber perform and wound onto a spool," wherein the "spool" can include "bulk spools" from which the fiber can be rewound "to a plurality of smaller shipping spools" (specification, pages 1-2). Thus, we are of the opinion that one of ordinary skill in this art at the time the claimed invention was made would have been armed with the knowledge that optical fibers are pulled from a fiber perform and wound on a spool, and thus would have found that the method of testing the strength of optical fiber **18** disclosed by Knowles is applied to the manufacturing process between pulling the optical fiber from the perform and winding the drawn fiber onto a spool.[8]

We further find that Knowles would have disclosed that the apparatus includes first and second tractor, that is, capstan, assemblies **10**,**11** (col. 2, ll. 6-7; **Figs. 1-3**). The first tractor assembly **10** includes tractor wheel **12** which clamps fiber **18** against belt **15** to apply tension to the fiber, the assembly being "driven by variable speed drive motor **24**" attached to tractor wheel **12** which applies constant tension to the fiber at all speeds (col. 2, ll. 7-16, 21-24, 28-29 and 49-56; **Fig. 1**).

The second tractor assembly **11** includes tractor wheel **19** which clamps fiber **18** against belt **22**, the assembly mounted on plate **28** which pivots around belt wheel shaft **27** connected to belt wheel **21** and is supported at the other end, that is, the "free end," by transducer **30** of load cell **29**, wherein belt wheel shaft **27** is part of a drive attached to a clutch of constant torque device **26** (col. 2, ll. 18-20, 31-33 and 38-42; **Figs. 1** and **2**). Transducer **30** and thus, load cell **29**, "produces an output indicating the force thereon" because "fiber tension is applied at a right angle to the support for" tractor assembly **11**, and thus, "the output of the load cell **29** indicates

[8] It is well settled that a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in this art would have reasonably been expected to draw therefrom, *see In re Fritch*, 972 F.2d 1260, 1264-65, 23 USPQ2d 1780, 1782-83 (Fed. Cir. 1992); *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968), presuming skill on the part of this person. *In re Sovish*, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985).

applied tension in the fiber" such that "[w]hen tension is increased, less force is applied to transducer **30** and vice versa" (col. 2, ll. 42-48).

The tractor assemblies are connected by belt **25** extending from variable speed drive motor **24** to constant torque device **26**, providing "means for driving" second tractor assembly **11** (col. 2, ll. 29-31; **Fig. 1**). Knowles would have taught that the "unloaded speed" of the drive including belt wheel shaft **27** of constant torque device **26** "is faster than the rotational speed of" first tractor assembly **10**, and when second tractor assembly **11** "pulls" fiber **18**, "its speed is reduced by causing the constant torque device **26** to overload and the clutch to slip" (col. 2, ll. 33-37; **Fig. 1**). When fiber **18** leaves tractor wheel **12** at point **17**, the fiber tension "is at the test setting" and remains at that setting until reaching tractor wheel **19** at point **31**, decreasing from that point to point **32** of tractor wheel **19**, such that "a constant test tension is applied to the fiber in the incremental length between" point **17** and point **31**, after which the "tension is released" at and after point **32** (col. 2, ll. 57-66; **Fig. 1**).

The output of load cell **29** can be "connected to control the constant torque device **26**" (col. 3, ll. 26-28; **Fig. 2**). Knowles would have taught that "[b]y modifying the power output of the clutch [of constant torque device **26**] in accordance with the output of the load cell **29**, the tension in the fiber can be closely controlled" (col. 3, ll. 28-31).

Knowles also would have taught that idler wheel **33**, between first and second tractor assemblies **10,11** as shown in **Fig. 2**, "pulls the fiber away from belt **15** so that the fiber [**18**] does not wrap around belt wheel **14**" of first tractor assembly **10** (col. 3, ll. 16-25).

In comparing the requirements to monitor the fiber tension between the capstans with a load cell and adjust the speed of one of the capstans in response to feed back from the load cell of the claimed method encompassed by claim 1 with that of Knowles, the examiner finds that the load cell **29** "'indicates' the tension" which "is the same thing as the claimed 'monitored,'" and this "feedback serves to adjust the clutch" of constant torque device **26**, explaining that "[i]f the clutch adjustment serves to transmit less power, then the clutch slips more, then the capstan will rotate less quickly (i.e. the speed is reduced), and if the clutch is adjusted to transmit more power, it will slip less, then the capstan will rotate more quickly," citing col. 2, ll. 28-56, and col. 3, lines 26-28, of Knowles (answer, pages 5-6). The examiner concludes that the apparatus of the

claimed method and that of Knowles both work on the principle that capstan speed affects the tension of the optical fiber and thus, the speed of a capstan can be changed to control the tension of the fiber (*id.*, pages 6-7).

Appellants submit that Knowles does not "suggest that a load cell should be used to monitor fiber tension during the draw process" and adjust the speed of a capstan based on the feedback from the load cell, contending that in the claimed invention encompassed by claim 1, "the circumferential speed of [the] screener capstan is adjusted in response to [the] monitored tension" and the term "'[m]onitor' is defined in the American Heritage Dictionary as 'to scrutinize or check systematically with a view to collecting certain specified categories of data'"[9] (reply brief, page 4, underline emphasis appellants'; brief, page 5). Appellants point to a specific embodiment of monitoring tension with a particular load cell arrangement and using the feedback to adjust capstan speed and thus, fiber tension (specification, page 10, ll. 26-29, and page 11, ll. 7-9), arguing that "in applicants' case, an electronic device keeps track of the tension, and collects information about the tension which is then used to adjust the circumferential speed of said screener capstan, depending on whether the tension is too high or too low," while Knowles does not do so (reply brief, pages 4-5; brief, page 5).

The examiner points out that appellants do "not give any indication as to why Knowles use of the load cell to indicate the tension does not read on the claimed 'monitoring' of the tension" (answer, page 10).

We find in Knowles substantial evidence supporting the examiner's position. We interpret the claim language "fiber tension between said capstans is monitored during the draw via a load cell" to involve any manner of monitoring by any manner of load cell (*see above* p.3). In the context of the claim language and in light of the use of the term in the written description in the specification, the term "monitored" has the customary dictionary meaning pointed to by appellants. The difficulty that we have with appellants' position is, as the examiner points out, the absence of argument establishing that the load cell and the subsequent use of feedback

[9] *The American Heritage Dictionary, Second College Edition* 810; *see also The American Heritage Dictionary Of The English Language* 1136 (4th ed., Boston, Houghton Mifflin Company. 2000).

therefrom in controlling the speed of a tractor assembly, that is, a capstan, in the method and apparatus disclosed by Knowles in fact does not satisfy the subject limitations of appealed claim 1 including the term "monitored." Indeed, we are of the opinion that the function of the load cell **30** to monitor the tension of the drawn optical fiber **8** by providing a measure of the same, and the use of the thus systemically tracked and collected information as feedback to constant torque device **26** to adjust the speed of the second tractor assembly **11** and thus, the tension of the optical fiber between tractor assemblies **10,11**, would have been clearly taught to one of ordinary skill in this art by Knowles, as we found above, and the examiner explains the manner in which this person would have understood the feedback from the load cell works to adjust fiber tension in the context of the disclosure of Knowles. Thus, as found by the examiner (answer, pages 5-7), the second tractor assembly **11** of Knowles satisfies the "second capstan" limitation, load cell **30** of Knowles satisfies the any manner of "load cell" limitation, and the use of the feedback from load cell **30** to adjust the speed of second tractor assembly **11** satisfies the last limitation of appealed claim 1 as well as the limitations in dependent claim 14 and independent 20 as the examiner points out (answer, pages 7 and 8; *see* reply brief, pages 6 and 7-8). Indeed, claim 20 requires only that "the tension . . . is monitored" in any manner and the "speed of the screener capstan is adjusted" in any manner "in response to said monitored tension."

Accordingly, we determine that the examiner has made out a *prima facie* case of obviousness of the claimed method encompassed by argued appealed claim 1, 14 and 20, and appellants' have not carried their burden of establishing otherwise.

Turning now to appealed dependent claim 4, rejected over the combined teachings of Knowles and Bice, this claim further limits claim 1 by specifying that the any manner of spool, e.g., **15**, onto to which optical fiber **8** is wound must enable access to both ends of the fiber. We find a preferred embodiment of such a spool **15** in **FIG. 6**[10] (page 8, ll. 26-30, and page 9, ll. 3-18). This spool is referred to as a "storage spool" and as a "shipping spool" (e.g., page 8, ll. 3-4 and 24-26, and page 9, ll. 12-14), and indeed, the terms "take up" (e.g., page 11, l. 30),

[10] The specification refers to "Figs. 6A and 6B" (page 8, ll. 24-26) which are not included in the "Brief Description of the Drawings" section of the specification (pages 7-8) and are not found in the sheets of drawings that are of record in the official electronic files of the USPTO.

"shipping" and "storage" are used interchangeably to characterize spool **15**. Thus, we determine that one of ordinary skill in this art would have had knowledge of the spools used to "take up" fiber during manufacture, "store" and/or "ship" optical fiber, with a spool being capable of all three functions, and therefore, appellants indeed need not definitively describe such spools. *See In re Howarth*, 654 F.2d 103, 210 USPQ 689, 691, 693 (CCPA 1981) ("An inventor need not, however, explain every detail since he is speaking to those skilled in the art. What is conventional knowledge will be read into the disclosure."). As we found above, appellants acknowledge that drawn fibers are wound on various spools in known fiber draw manufacturing techniques, and, as the examiner finds, Knowles also evinces that winding optical fiber on a spool was known in the art (*see above* p.5). Thus, on this record, any spool known for the take up, storage and/or shipping of optical fibers, including spools which enable access to both ends of the optical fiber, would have been used by one of ordinary skill in this art in optical fiber draw manufacturing processes that use the methods and apparatus disclosed by Knowles, as indeed, this person would not have found any requirement in Knowles for a particular kind or size of spool.

We are reinforced in our view by the examiner's finding that Bice would have acknowledged in the background section thereof that OTDR is an important optical fiber test which requires access to both ends of the fiber (answer, pages 9 and 12), which finding accords with appellants' acknowledgment that OTDR is an example of a test that utilizes both ends of a length of fiber (specification, page 3, ll. 19-25). Thus, while we agree with appellants that Knowles and Bice do not disclose such a spool *per se* (reply brief, pages 8-9; brief, pages 8-9), on this record, one of ordinary skill in the art would have been motivated to use a spool that enables access to both ends of the optical fiber to run OTDR tests which are important as acknowledged by Bice and by appellants. We point out here with respect to appellants' reference to the spool described in specification **FIG. 6** in argument (reply brief, page 8), that there is no limitation in appealed claim 4 specific to this preferred embodiment and we find no basis in the language in this claim or in the written description in the specification to read such a limitation into the claim. *See Morris*, 127 F.3d at 1054-55, 44 USPQ2d at 1027; *Zletz*, 893 F.2d at 321-22, 13 USPQ2d at 1322. Appellants takes the same position with respect to claim 11, which stands

rejected on both grounds, as with claim 4 (reply brief, page 6), and we find no limitation in claim 11 which would result in a different determination than we made with respect to claim 4.

Accordingly, we determine that the examiner has made out a *prima facie* case of obviousness of the claimed method encompassed by argued claims 4 and 11, and appellants' have not carried their burden of establishing otherwise.

We are also not convinced of error in the examiner's position with respect to the other appealed dependent claims argued by appellants that stand rejected over Knowles alone or over the combined teachings of Knowles and Bice.

We first consider claim 33 and claims 16 and 34. The examiner finds with respect to claim 33, that all of the components of the apparatus of Knowles are "operatively connected" to the fiber, pointing out that a "specialized definition" for this phrase "is not of record" (answer, pages 12-13), and appellants point to the disclosure "[f]or example, the tension in the fiber can be monitored via a load cell . . . operatively connected to a pulley, which in turn contacts the fiber" at page 4, ll. 2-4, of the specification, without further argument on the meaning of the subject phrase (reply brief, pages 9-10).

We agree with the examiner. The term "operatively connected . . . is a general term frequently used in patent drafting to reflect a functional relationship between claimed components . . . [and generally] means the claimed components must be connected in a way to perform a designated function." *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1118, 72 USPQ2d 1001, 1006 (Fed. Cir. 2004). We have considered this term in the context of the language of claim 33 and the written description in the specification, including the drawings, in giving it the broadest reasonable interpretation in ordinary usage in context, mindful that a limitation or particular embodiment disclosed in the specification cannot be read into the claim. *See Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d at 1364, 70 USPQ2d at 1830; *Morris*, 127 F.3d at 1054-55, 44 USPQ2d at 1027; *Zletz*, 893 F.2d at 321-22, 13 USPQ2d at 1322 (Fed. Cir. 1989); *cf. Innova*, 381 F.3d at 1115-20, 72 USPQ2d at 1004-08. The plain language of dependent claim 33 simply requires "said monitoring step comprises" at least "monitoring said tension via a load cell operatively connected to said fiber" without specifying the manner in which the load cell is "operatively connected" to the fiber in order to monitor the tension in the

fiber. As pointed out by the examiner, no meaning for "operatively connected" is set forth in the written description of the specification, and the disclosure at page 4, ll. 2-4, of the specification, on which appellants rely, is merely an "example" of a general arrangement which can provide the claimed function with little specific structure which we will not read into the claim as a limitation. Accordingly, on this record, we determine that the phrase "operatively connected" would have its customary general meaning in claim drafting, and thus, claim 33 encompasses the load cell **29** operatively connected to fiber **8** via tractor assembly **11** mounted on plate **28** of Knowles, which arrangement is capable of performing the function designated in the claim of monitoring the tension of the fiber between capstans which can be the tractor assembles of Knowles.

The plain language of claims 16 and 34 requires any manner of "a load cell connected" in any fashion to any manner of "a pulley which . . . contacts the fiber . . . causing said pulley to rotate," in which the term "connected" is at issue. Appellants submit that under the examiner's use of the term "connected," "every machine in the word is connected," and in this respect, point to the term as used in the disclosure of a particular embodiment in the specification at page 10, ll. 26-29: "[t]urnaround pulley 22 is connected to a load cell which monitors the amount of tension applied onto the turnaround pulley by the passing fiber, and thus monitors the amount of tension being imparted to the fiber;" and at page 11, ll. 6-9: "in a preferred embodiment, feedback from the load cell of the turnaround pulley 22 is used to adjust the differential speed of the screening capstan 24 so that a sufficient screening tension is maintained consistently throughout the drawing of the entire optical fiber blank into optical fiber" (reply brief, pages 6-7 and 10; brief, pages 5-6). Appellants argue that this disclosure makes clear "that the pulley must be operatively connected to the load cell so that the load cell can monitor tension of the fiber via contact with the pulley" (*id.*). The examiner submits that appellants' position requires reading limitations from the specification into the claims (answer, pages 10-11).

We have considered the term "connected" of these claims in the context of the claim language and the written description in the specification, including the drawings, in giving it the broadest reasonable interpretation in ordinary usage in context, mindful that a limitation or particular embodiment disclosed in the specification cannot be read into the claim.

*See Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d at 1364, 70 USPQ2d at 1830; *Morris*, 127 F.3d at 1054-55, 44 USPQ2d at 1027; *Zletz*, 893 F.2d at 321-22, 13 USPQ2d at 1322 (Fed. Cir. 1989); *cf. Innova*, 381 F.3d at 1119-20, 72 USPQ2d at 1007-08. In the embodiment relied on by appellants, which is illustrated in specification **FIG. 2**, the function of pulley **22** as a "turnaround pulley" as disclosed and illustrated describes the pulley in contact with fiber **8** which thus rotates the pulley. However, there is no description or illustration of "a load cell" or the manner in which it is "connected" to pulley **22** and the fiber in contact therewith. We find no other disclosure in the written description or the drawings which describes or illustrates "a load cell" or the manner in which "a load cell" is "connected" to "a pulley" (*see also above* p. 3).

On this record, we determine that the term "connected" in the context of the claim language does not limit the claims to an actual physical engagement of any manner of load cell to the pulley such that the pulley must be directly involved with the monitoring of fiber tension by the load cell. Indeed, we find no basis in the claim language or in the written description in the specification, including the drawings, on which to read the relied on embodiment as a limitation into the claims. *cf. Innova*, 381 F.3d at 1119-20, 72 USPQ2d at 1007-08 ("connected to" broadly construed); *Ethicon Endo-Surgery Inc. v. U.S. Surgical Corp.*, 93 F.3d 1572, 1577-78, 40 USPQ2d 1019, 1023 (Fed. Cir. 1996) ("connected to" narrowly construed). Thus, we agree with the examiner's finding that idler wheel **33** of Knowles **Fig. 2**, "is the pulley . . . connected (via [tractor assembly] 11) to the load cell" **29** and "fiber contact causes the pulley to rotate because the pulley is an idler wheel," thus falling within claims 16 and 34 (answer, page 8), even though as appellants correctly point out, "the load cell in Knowles is connected to plate 28" and not directly to pulley.

We now consider claims 17 and 35, which require "a computer" that "monitors said tension in said fiber via a load cell," and claims 59 and 60, which require that the "tension is monitored electronically." With respect to the latter set of claims, appellants contend that "electronic monitoring does not appear to be mentioned in Knowles" (reply brief, page 8), while the examiner takes the position that "Knowles load cell 29 is an electronic device since it creates electronic signals" (answer, page 11). On this record, we agree with the examiner. We found above that Knowles would have disclosed that load cell **29** is connected to tractor assembly **11** on

plate **28** via transducer **30** (*see above* pp. 5-6). We find that one of ordinary skill in this art would have given the term "transducer" it customary dictionary meaning in context of "[a]ny device or element which converts an input signal into an output signal of a different form,"[11] and would have recognize that the electronic output signal of transducer **30** is processed by load cell **29**, with the electronic output of load cell **29** then used to control constant torque device **26** (*see above* p. 6). Thus, Knowles would have suggested the claimed invention encompassed by claims 59 and 60 to one of ordinary skill in this art. In view of the electronic outputs of transducer **30** and load cell **29** and the subsequent use of the latter to control the apparatus in the method of Knowles, we agree with the examiner that one of ordinary skill in the art would have used any manner of "a computer" in connection therewith to monitor the tension in the optical fiber and to control the apparatus (answer, pages 8 and 11), appellants presenting no substantive contrary argument based on the disclosure of Knowles (reply brief, pages 7 and 10; brief, page 8).

Finally, we consider claim 2, which specifies a fiber draw speed range as well as claims 18 and 36 and claims 19 and 37 which specify ranges of fiber length wound on a spool. Contrary to appellants' arguments (brief, page 8; reply brief, pages 5-6 and 7), we agree with the examiner's position (answer, pages 7, 8 and 11). This is because we find that one of ordinary skill in the art routinely following the teachings of Knowles would have determined the workable or optimum fiber draw speed range and ranges for wound fiber lengths for an apparatus falling within the teachings of the reference, and appellants have not established otherwise by a showing of the criticality of the claimed ranges. *See In re Woodruff*, 919 F.2d 1575, 1577-78, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990) ("[T]he applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range. [Citations omitted.]"); *In re Aller*, 220 F.2d 454, 456-58, 105 USPQ 233, 235-37 (CCPA 1955). ("[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.").

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in Knowles taken with Keck and Halliday and in this

[11] *McGraw-Hill Dictionary of Scientific and Technical Terms* 2053 (5th ed., Sybil P. Parker, ed., New York, McGraw-Hill, Inc. 1994).

combination as further combined with Bice with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 through 14, 16 through 30, 33 through 37, 59 and 60 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

*AFFIRMED*

BRADLEY R. GARRIS )
Administrative Patent Judge )
)
)
)
CHARLES F. WARREN ) BOARD OF PATENT
Administrative Patent Judge ) APPEALS AND
) INTERFERENCES
)
)
BEVERLY A. FRANKLIN )
Administrative Patent Judge )

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